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## Campylobacter on U.S. Beef Cow-calf Operations, 2007–08

*Campylobacter* is one of the most common causes of diarrheal illness in humans in the United States. In humans, *Campylobacter* infection can cause fever, abdominal cramping, and diarrhea. Severe infections can result in death. In some cases, foods of animal origin have been implicated as the source of human illness caused by *Campylobacter*. Although human foodborne illness caused by *Campylobacter* has primarily been attributed to poultry, there is evidence that other sources such as red meat may also be sources of human exposure.<sup>1</sup>

Antimicrobials are not necessary for the treatment of most *Campylobacter* infections; however, antimicrobial resistance in *Campylobacter* is a concern because it can complicate treatment options in severe infections. Most human illness from campylobacteriosis is caused by *Campylobacter jejuni*, but *C. coli* and other species can cause illness as well. This information sheet focuses on *C. jejuni* and *C. coli* because they are most commonly associated with human disease.

### Beef 2007–08 study

The U.S. Department of Agriculture's National Animal Health Monitoring System conducted the Beef 2007–08 study, which focused on beef cow-calf health and management practices in 24 States from three regions of the United States. These States represented 79.6 percent of U.S. operations with beef cows and 87.8 percent of U.S. beef cows.

One objective of the Beef 2007–08 study was to describe the occurrence of *Campylobacter* and associated antimicrobial resistance on beef cow-calf operations.

Testing for *Campylobacter* was performed on 173 of the beef cow-calf operations participating in the study. Up to 20 fresh fecal samples from individual fecal pats on the ground were taken from each operation and tested for presence of *Campylobacter*. Care was taken to ensure that samples originated from adult beef cows.

#### \*States/Regions

**West:** California, Colorado, Idaho, Montana, New Mexico, Oregon, Wyoming

**Central:** Iowa, Kansas, Missouri, Nebraska, North Dakota, South Dakota

**Southeast:** Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Oklahoma, Tennessee, Texas, Virginia

Of the 2,917 samples collected, 259 (8.9 percent) were positive for *Campylobacter*, and at least one positive sample was found on 77 of the 173 operations (44.5 percent). Of the 259 *Campylobacter* isolates, almost 95 percent were *C. jejuni* and about 4 percent were *C. coli*. *C. jejuni* was found on almost all of the 77 operations positive for *Campylobacter* (table 1).

**Table 1. Number and Percentage of Samples Tested for *Campylobacter*, (and Number and Percentage of Operations Sampled), by Test Results**

Results	Samples		Operations	
	No.	Pct.	No.	Pct.
Negative	2,658	91.1	96	55.5
Positive				
<i>C. jejuni</i>	244	8.4	75	43.4
<i>C. coli</i>	10	0.3	5	2.9
Unknown or not typed	5	0.2	4	2.3
Total	2,917	100.0	173*	NA

\*Seven operations had more than one species of *Campylobacter* isolated (counting "not typed" as a species).

*Campylobacter* was significantly more likely to be found on operations with 50 or more beef cows than on operations with fewer than 50 beef cows (table 2).

**Table 2. Number of Operations Tested for *Campylobacter* (and Number and Percentage of Operations with at Least One Sample Positive for *Campylobacter*), by Herd Size**

Herd size (Number of Beef Cows)	Number Tested	Number Positive	Percent Positive
1–49	49	8	16.3
50–99	26	10	38.5
100–199	42	23	54.8
200 or more	56	36	64.3
Total	173	77	44.5



The largest number of sampled operations were in the Southeast region, which were significantly less likely to be *Campylobacter*-positive (table 3).

**Table 3. Number of Operations Tested for *Campylobacter* (and Number and Percentage of Operations with at Least One Sample Positive for *Campylobacter*), by Region**

Region	Number Tested	Number Positive	Percent Positive
West	39	19	48.7
Central	54	32	59.3
Southeast	80	26	32.5
Total	173	77	44.5

### ***Campylobacter* antimicrobial susceptibility**

Over one-half of the *C. jejuni* isolates (56.2 percent) were susceptible to all nine antimicrobials tested. Of the antimicrobials in table 4, ciprofloxacin and erythromycin are especially important because they are often used to treat humans infected with *Campylobacter*.<sup>2</sup> Less than 7 percent of *C. jejuni* isolates were resistant to ciprofloxacin, and less than 1 percent were resistant to erythromycin. The highest percentage of isolates (38.9 percent) were resistant to tetracycline. Of the 10 *C. coli* isolates tested for antimicrobial susceptibility, 6 were resistant to tetracycline, 2 were resistant to ciprofloxacin, and 2 were resistant to nalidixic acid.

**Table 4. Percentage of Resistant *C. jejuni* Isolates, by Antimicrobial:\***

<i>C. jejuni</i> (n=244)	
Antimicrobial	Percent
Azithromycin	0.4
Ciprofloxacin	6.6
Clindamycin	0.8
Erythromycin	0.4
Florfenicol	0.0
Gentamicin	0.0
Nalidixic Acid	6.1
Telithromycin	0.0
Tetracycline	38.9
Resistant to two or more antimicrobials	8.2
Susceptible to all nine antimicrobials	56.2

\*Intermediate isolates were classified as susceptible.

## **Summary**

*Campylobacter* was found on less than one-half of the beef cow-calf operations tested and in less than 10 percent of the collected samples. About 95 percent of the *Campylobacter* isolates were *C. jejuni*. *Campylobacter* was less likely to be isolated from smaller herds and herds in the Southeast region. Relatively few *Campylobacter* isolates were resistant to antimicrobials, and over one-half of the *C. jejuni* isolates were susceptible to all of the antimicrobials against which they were tested. The highest percentage of resistance was observed for tetracycline. Few isolates were resistant to ciprofloxacin or erythromycin. Resistance to two or more antimicrobials occurred in less than 9 percent of isolates.

## **References**

1. Bae, W, Kaya, KN, Hancock, DD, Call, DR, Park, YH, Besser, TE. 2005. Prevalence and antimicrobial resistance of thermophilic *Campylobacter* spp. from cattle farms in Washington state. *Appl. Environ. Microbiol.* 71:1;169-174.
2. Gupta, A, Nelson, JM, Barrett, TJ, et al. Antimicrobial resistance among *Campylobacter* Strains, United States, 1997-2001. *Emerg. Infect. Dis.* 10:6; 1102-1109.

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